Public Scoping on Petroleum Cleanup Levels
Summary of Comments Received
August 26, 2016-January 31, 2017

Topic	Comment
AK Methods	Defining a separate set of carbon ranges for the Alaska methods would limit the number of laboratories that would develop this method for routine use and therefore affect the cost of this method.
AK Methods	5.2 – Minor revision of the lab methods that is all that is required (if anything is required). 6.1 – If you mean changing the carbon range from C6 to C5, and C25 to C21, then I think the changes to would be minimal and largely invisible (if they are needed at all). The old data is expected to be similar to the data collected using the revised ranges because the C5 to C6 fraction has a short overall half-life in the environment and fro arctic diesel and jet fuels, there is very little mass in the C21 to C25 range.
AK Methods	Do you want to repeal the AK methods?
AK Methods	AK 103 method is very poor and either it should be changed or eliminated.
Analytical Methods	We recommend adopting or modifying an existing analytical method for petroleum hydrocarbons such as the Texas (TX) 1005/1006 method for both the bulk and fraction analyses rather than updating the Alaska Methods. In the TX method, the purgeable (volatile) and extractable components of the sample do not need be separated prior to analysis. This allows the sample to be analyzed by GC-FID for TPH bulk (GRO/DRO/RRO ranges) and then the fractionated ranges (for any subset of fractions). A modification to this method can include a silica gel cleanup either before or after the bulk analysis so that naturally-occurring hydrocarbons and polar compounds are removed.
Analytical Methods	Have you considered adopting the NWTPH method?
Analytical methods	The Texas 1005 and 1006 methods should be considered as alternatives to the AK, VPH & EPH methods.
Analytical Methods	Have you looked at the Texas methods 1005 and 1006?
Analytical Methods	Could we develop a method specifically to report polar metabolites?
Analytical Methods	Regarding changes to the AK methods, the Northwest TPH Methods and associated implementing guidance provide a comprehensive, reliable approach to evaluating the composition and assessing the risk of petroleum contamination. The use of these existing analytical methods would minimize cost and schedule impacts.
Analytical Methods	We recommend the use of the Northwest TPH Analytical Methods, as developed, adopted, and implemented by the States of Washington and Oregon to address petroleum contaminated sites and media including petroleum releases from underground storage tanks
Arctic zone	I was wondering if we have considered climate change effects in our Arctic numbers or our tundra &pad numbers? In particular, I am thinking about thawing of permafrost and the formation of taliks.

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Arctic Zone – Eco	One suggestion for development of petroleum cleanup levels in the arctic zone would be to focus on the physical impact of the spill on organisms (e.g., suffocation, oil coating) rather than develop fraction- or mixture-specific numerical standards. The focus could be on aquatic organisms when near surface water and on terrestrial macroinvertebrates and/or small mammals for upland spills.
Arctic Zone – Eco	3.5.5 – The ADEC needs to provide additional documentation regarding why the human health cleanup levels are not protective of the arctic environment.
Arctic Zone – Eco	The regulation should allow for greater flexibility by allowing site-specific, receptor-based cleanup levels for the tundra environments in the Arctic Zone, instead of listing numeric cleanup levels. It appears that the tundra category of cleanup level would be used as a proxy for ecological risk. Ecological risk in the Arctic includes more receptors than just vegetative tundra, and the ADEC Tundra Treatment Guidelines classifies tundra types as different receptors. Summarizing the cleanup level into one single number, particularly if it is the most stringent, seems imprecise for the multiple receptors that should be included in an ecological risk evaluation for the Arctic. Further complicating an ecological (tundra) cleanup number, naturally-occurring hydrocarbons in tundra are often reported in laboratory analyses as petroleum hydrocarbons. Consideration must be given to which analytical methods are applicable for comparison to a "tundra" cleanup level.
Arctic Zone – Soil	We recommend evaluation of distinct cleanup levels for pads and tundra to ensure cleanup levels adequately reflect the respective human health exposure and migration pathways of these two, vastly different, environments.
Arctic Zone – Soil	Gravel pads and tundra represent very different environments with different potential receptors, uses, and associated risks. Therefore, we do not agree with the example table that shows one set of cleanup levels that would apply to both pads and tundra. Therefore, the example table showing one set of cleanup levels that would apply to both pads and tundra should be changed to reflect the different environments.
Arctic Zone – Water	We disagree with use of water quality standards to demonstrate compliance for gravel fill. Risk of migration from the pad (gravel fill) to surface water within the Arctic Zone arises when petroleum hydrocarbon concentrations exceed the soil saturation limit. Proposed changes, if warranted, should include consideration of the gravel fill soil type and applicable residual saturation levels to determine the appropriateness of using water quality standards to demonstrate compliance
Arctic Zone – Water	We disagree with the Department that surface water quality criteria should apply to suprapermafrost groundwater in the Arctic zone. Supra permafrost groundwater is only liquid for part of the year and there is no exposure to chemicals in this medium. In many cases, there is no connection between suprapermafrost groundwater and surface water features and, in such cases, chemical transport between these two media cannot occur. Only if chemicals in this medium migrate to surface water can there be exposure and hence risk. Use of surface water criteria directly as a requirement for suprapermafrost groundwater also does not account for dilution that would occur if migration were to take place. Comparison of surface water quality criteria to supra permafrost groundwater concentrations only has value if data confirms a direct connection exists, and in these cases, comparison would only be relevant at the actual interface. Although comparison may be of interest at the interface, surface water quality criteria should still only apply to the medium for which it was created - surface

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	water. Surface water criteria could be used for screening purposes, but should not be a requirement for this transport medium. For solid waste purposes, we recommend placing points of compliance at pad boundaries to ensure tundra surface water is adequately protected.
Arctic Zone – Water	Surface water and suprapermafrost groundwater are separate media; exposure and hence risk only occurs in surface water. Therefore, we think it is generally inappropriate to use surface water quality standards as regulatory goals for suprapermafrost groundwater.
Arctic Zone – Water	Water quality standards are designed to demonstrate compliance in surface water, not in gravel fill. The suggested changes state that more stringent levels than those listed in the Method one table can be used in the tundra environment in the Arctic zone. Unless chemicals leach from gravel fill and migrate to surface water in the tundra, such a comparison is not warranted as there is generally no surface water exposure to chemicals in gravel fill. Further, gravel fill comes from a variety of natural sources; moving this gravel to a pad, for example, should not trigger compliance issues unless contaminant releases have been identified.
Arctic Zone – Water	The Arctic zone presents special challenges. The boundary between suprapermafrost groundwater and surface water is not always easy to describe and the hydrologic nomenclature can be confusing. For example, suprapermafrost groundwater is not considered groundwater in the regulatory sense. It may be helpful for DEC to provide guidance that defines hydrologic terms, describes appropriate sampling strategies, and clarifies the point of compliance for suprapermafrost groundwater and surface water environments in the Arctic zone.
Background	The contribution of the volatilization from tap water route should be compared to background indoor air concentrations.
Biogenic	Are you going to provide a firmer, more detailed procedure for dealing with biogenic material?
Calculations	The ADEC needs to explicitly point out and make the case for summing the risk posed by the aromatic and aliphatic soil fractions because this is a significant change from the way that risk has been addressed for the last 18 plus years.
Calculations	5. – If the volatilization from tap water route is included, the calculation must be representative of the differences in the volatilization rates between the fractions. The Andelman constant currently used by the ADEC is not representative for the lower volatility compounds that are considered volatiles (the same change needs to be made for the individual compounds).
Calculations	We recommend ADEC consider providing additional information for the public on specific quantitative proposed cleanup thresholds, and an explanation on how the proposed revisions will result in improved human health and environmental protection.
Calculations	Are there new equations utilized for proposed Table 1 levels due to new ranges, etc.
Calculations	What is the size of a child for calculating cleanup levels?
Calculations	I would like specifics regarding how the human health cleanup level is derived from ingestion and inhalation.

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Cleanup levels	The results of the proposed calculation needs to be reviewed for reasonableness and overall impacts. This includes assessing the cost associated with any proposed regulation changes.
Combine Field Sampling Guidance with UST Procedures Manual	It would be more efficient to have all cleanup regulations in one document.
Combine Field Sampling Guidance with UST Procedures Manual	The UST Manual should be separate from the Field Sampling Guidance. These are two very different things and the sampling guidance is a lot of information without adding the UST information into the mix.
Cost	Requiring both GRO/DRO/RRO and EPH/VPH analyses, and being required to meet both targets, is confusing and costly. We can envision many situations where samples pass one yet fail another. What happens then? We don't think it is workable to have standards for both GRO/DRO/RRO and EPH/VPH. The department should phase out GRO/DRO/RRO analyses and cleanup levels and work only with the fractions if the fraction approach is adopted. We do not think that this "provides flexibility for the regulated community" unless it is combined with clear decision criteria to ensure that the regulated community understands outcomes if none, one, or both sets of cleanup levels are met.
Cost	There is a concern that having cleanup standards that are overly stringent could increase costs which can prevent getting cleanup work done and may ultimately lead to contaminated sites not getting addressed. Coming up with a balanced method to address contamination and protect human and environmental health without increasing an already expensive process is crucia1.
Cost	ADEC should consider the costs and benefits of the proposed regulatory changes as cost and schedule impacts could be significant. The proposed analytical methods to evaluate the 13 to 16 fractions are likely to be significantly more expensive than current methods.
Cost	The State of Alaska is facing a fiscal deficit that has put financial constraints on all state departments. Given the State budgetary limitations, please consider this when reviewing the new petroleum changes as this could delay cleanup for state sites.
Cost	Is it cost effective? You stated in your speech, "NO". The testing will be much higher than what is being done now.
Cost	Those who went with method two normally, would we now go with method 1 to achieve lower costs? What's the cost difference now?
Cost	So this screams big site, big money right? More applicable for federal facilities?

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Cost	Will the new methods cost more? Will more samples be required? If there is more complexity/cost, less cleanup may occur.
Cost	Lack of sufficient financial resources for many responsible parties necessary to achieve site characterization to the satisfaction of DEC.
Ecological	We agree that ecological receptors are likely the most appropriate upon which to base TPH cleanup levels. We suggest that the department develop cleanup levels protective of target ecological receptors for the receiving environments (e.g., surface water, sediment, and soil). SLR can offer their services to support this endeavor through the work we have conducted on the North Slope over the past decade. We do not anticipate that the polar fraction will be persistent in the environment, and hence it is unlikely to pose a potential risk to ecological populations or communities.
Ecological	Because ADEC indicates the petroleum cleanup levels that are currently capped at solubility may not be adequately protective of ecological receptors or all potential uses of groundwater, it appears that ADEC should further investigate and propose alternative solutions that more adequately protect ecological receptors and groundwater.
Examples	We suggest specific examples be provided for the public to more easily digest the proposed changes and explain how protections will be improved.
Fuel properties	Note that using a fresh fuel as the foundation for the calculation may be overly conservative for GRO because the C5 and C6 aromatics and aliphatics tend to have high attenuation rates.
Fuel properties – Chemical Properties	Table 4. It would be helpful to provide sources for the parameters. Some of the values (e.g., vapor pressure, solubility) are different than those presented by TPHCWG for the same carbon fractions. For example, was the water solubility equation listed as a note used for all fractions, or were some values actually measured?
Fuel Properties - Fractions	The percentages listed for most fractions do not match the values provided in the cited source. One issue is that gasoline includes a small percentage of chemicals in the diesel carbon range and a smaller percentage in the residual range; the same is true for diesel fuel, which includes chemicals in the residual range and in the gasoline range. It is not clear how or if this was addressed in Table 1. See Attachment 1 for recommended values from the cited source. The fraction of gasoline consisting of the C5-C10 range shown in the cited source of 86% is adjusted to 100% in Attachment 1. This has the effect of lowering the fraction of aliphatic compounds in the mixture relative to that shown in the cited source (see next comment). Since the aromatic fraction has higher toxicity, this results in a lower cleanup level and hence is more conservative.
Fuel Properties - Fractions	The GRO breakdown in the cited source says 63:37 aliphatic:aromatic. Why does the table not match this breakdown? Adjusting the 86% total content of compounds between C5 and C10 to 100% lowers the ratio from 63:37 to 55:45 because the other 14% of gasoline mass consists of aliphatic compounds heavier than C10. This 14% gets divided into both aliphatic and aromatic fractions using the relative ratios from the cited source. Neither of these approaches yields a 50:50 breakdown.

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Fuel Properties - Fractions	The DRO breakdown in the cited source only totals 92% for mass consisting of chemicals within the C10-C21 carbon range. Therefore, similar to comment 7, the ratios need to be adjusted to assume 100% of mass is within this carbon range. Although Table 1 shows the correct breakdown between aromatic:aliphatic compounds, the relative percent of different fractions we calculate from the cited source is slightly different than those listed in the table. Please see Attachment 1 for our recommendations.
Fuel Properties - Fractions	RRO is listed as 70:30 aliphatic:aromatic, but no RRO samples were collected in the cited source. Please provide the basis of this breakdown.
Fuel properties – Fractions	Naphthalene has only 10 carbon atoms, but is being suggested as a surrogate for the >C10-C12 range. This is a trend for the aromatics in this table – each of the surrogates has fewer carbon atoms than the low end of the range for the group it is intended to represent. Although the State of Washington also has implemented this practice, it would seem to be more appropriate to select surrogate chemicals that lie within the target carbon range. 1,1-Biphenyl, with 12 carbon atoms, may be more appropriate to represent this >C10-C12 range than naphthalene, rather than using it as a surrogate for the next larger carbon atom range (see next comment). Alternatively, if the equivalent carbon number for naphthalene (11.69) is being used to assign surrogates, this should be discussed and rationale presented.
Fuel properties – Fractions	1,1-Biphenyl was selected as the surrogate compound for the aromatic C12-C16 range. This chemical was identified by TPHCWG as representative of the C10-C12 range, which is appropriate since 1,1-biphenyl contains 12 carbon atoms. It does not seem appropriate to have this 12-carbon compound serve as a surrogate for a group of chemicals containing more carbon atoms (>C12). We suggest instead using pyrene (C16) to represent this range. Pyrene has the lowest RfD across the PAHs in this carbon range (including fluorene, fluoranthene, acenaphthene, and anthracene), and better represents this group of chemicals than the >C16-C21 group for which it is listed as the surrogate. Alternatively, if the equivalent carbon number for pyrene (20.8) is being used to assign surrogates, this should be discussed and rationale presented.
Fuel properties – Fractions	We do not agree with the selection of pyrene as a surrogate for the >C16-C21 range because pyrene has 16 carbon atoms and falls outside of the target carbon range for this group of chemicals. Alternatively, if the equivalent carbon number for pyrene (20.8) is being used to assign surrogates, this should be discussed and rationale presented.
Fuel properties – Fractions	Fluoranthene, a C14 compound, is suggested to be the surrogate for the >C21-C35 carbon range chemicals. We do not agree since fluoranthene does not have enough carbon atoms to represent this group. Benzo(g,h,i)perylene (C22) would be ideal as a surrogate for this group, but this chemical has no toxicity values. The State of Washington uses dibenzo(a,h)anthracene and indeno(1,2,3-cd)pyrene as surrogates for this fraction, but these PAHs do not have noncancer toxicity values. MADEP does not quantify this aromatic fraction; they stop their evaluation of aromatics at C22. Alternatively, if the equivalent carbon number for fluoranthene (21.85) is being used to assign surrogates, this should be discussed and rationale presented. Comparatively, the equivalent carbon number for benzo(g,h,i)perylene is 34.01.
Fuel properties – Fractions	There appears to be some discrepancies between the fraction boundaries on Table 3 and Table 4. Also, the equivalent carbon that is considered representative of a fraction should be discussed. For example the C5 to C8

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	aromatic fraction appears to use a mean value of 6.5 to represent the fraction but all of the compounds in the fraction have an EC number greater than 6.5.
Fuel properties – Fractions	Consider renaming the listed individual fraction range for BTEX from C5-C8 to "Aromatic C5-C8" since C5-C8 includes more than BTEX compounds.
Fuel properties – Fractions	Doesn't gasoline vary in mixtures so the fractions can also vary correct?
Fuel properties – Toxicity	Toxicity of individual chemicals and resulting health impacts (for complete pathways) are wild guesses compared to pathway risks. Animals are fed a chemical to find the "no observed adverse effect level" (NOAEL), and that value assigned a safety factor (SF of 10, 100, 1000); the greater the uncertainty, the higher the SF. The acceptable daily intake (ADI) is: ADI=NOAEL/SF. Each experiment yields different results with high initial uncertainty (SF) and very low ADI; repetition may reduce the SF. Any new pathway or sensitive population starts with a high SF and low ADI.
Fuel properties – Toxicity	Table 3 – please define the Tiers listed in the far right column. What do Tier 1 and Tier 3 mean?
Fuel properties – Toxicity	Table 3. There are no units listed on the table. We assume the RfC is in units of mg/m3 and the RfD has units of mg/kg-day.
Fuel properties – Toxicity	Carcinogenic risk analysis of aliphatics should be limited to compounds for which there are defensible and appropriate studies that identify cancer endpoints resulting in toxicity values and should be addressed on an individual basis (similar to the indicator compounds benzene and naphthalene), rather than as part of a surrogate toxicity approach. Toxicity values should be obtained from sources that are consistent with the USEPA's recommended 3-tier hierarchy (OSWER Directive 9285.7-53, December 5, 2003).
Fuel properties – Toxicity	What RfD and RfC values will be used in any proposed regulation changes?
Fuel properties – Toxicity	Oral and inhalation toxicity values are available for fractionated hydrocarbons, and are typically orders of magnitude different. Consider providing both ingestion and inhalation cleanup levels rather than a combined human health level to accommodate different exposure routes even though this would not be consistent with Table B1 of 18 AAC 75.
Fuel properties – Toxicity	A comparison of the RfD and RfC toxicity values proposed by ADEC and the known sources of toxicity values of hydrocarbon fractions including MADEP, TPHCWG, EPA PPRTVs, and EPA RSLs are shown on the included chart. The ADEC approach show values generally similar to those sources with a few exceptions. The exceptions are highlighted in the chart below (red font). We recommend revising the surrogate approach for those fractions highlighted to be similar to the MADEP or TPHCWG values. Also, consider using one toxicity value across a broader carbon range, shown below for the four other sources, to avoid large differences in toxicity between similar compounds.
Fuel properties – Toxicity	The EPA's document *Provisional Peer-Reviewed Toxicity Values for Complex Mixtures of Aliphatic and Aromatic Hydrocarbons* indicates that the RfD values listed in the EPA RSLs for Medium Range Aromatics and Aliphatics

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	are based on one surrogate. The ToxStrategies report *Review of the Scientific Basis of USEPA's Provisional Peer-Reviewed Toxicity Values for Total Petroleum Hydrocarbon Fractions* recommends that the RfD values should instead be a combination of multiple surrogates. Based on this report, we recommend that ADEC consider using multiple surrogates when selecting or calculating toxicity values for each carbon range, rather than selecting the most stringent toxicity value. Both reports are enclosed with this comment letter for your use.
Fuel properties – Toxicity	Carcinogenic risk considerations (i.e. slope factors) were not included in the regulation scoping materials. Please consider describing the ADEC approach to addressing carcinogenic effects, if any, in the regulations. Will DEC address carcinogenic effects?
General	We support the Alaska Department of Environmental Conservation's (ADEC) efforts to modernize and improve Alaska's petroleum cleanup level regulations, We support regulatory changes that are more streamlined and efficient and that do not result in degradation of Alaska's existing petroleum cleanup levels.
General	Are the regulations easier to understand? No, the State of Alaska has only a handful of contractors that fully understand our current regulations. I find myself frequently training a contractor on how to properly do their job. Again the government is adding another layer of regulations that may seem easy to us to understand but the public does not understand.
General	I believe you are on the right track but I do not believe Washington state regulations will work in Alaska. I see law suits in the near future. Good luck.
General	We recommend specific, quantitative cleanup levels for each zone and an explanation on how the proposed cleanup levels compare to existing cleanup thresholds be provided.
General	Have you gotten any comment or feedback from a typical homeowner?
General	Have you given any thought to regulating home heating oil tanks for installation, use etc.? You could target certain communities initially. People are just unaware of how heating oil tank's integrity could affect their liability. You are stepping in the right direction.
General	Having flexibility is good so this concept is supported.
General	In general, there was lots of discussion after the meeting among SPAR staff that method two proposed would not be helpful for their sites because of increased sampling and cost. We suggested that method 1 would likely be utilized more frequently and it was suggested this should have been discussed in more detail during the work shop. There was lots of concern that sites would languish more with the changes.
Groundwater	We encourage the consideration of groundwater cleanup levels based on a broader basis than human health considerations alone. The impacts of pollution to natural resources, the taste and odor of groundwater, protection of ecological receptors, and protection of all potential groundwater uses are valid considerations for DEC to pursue in setting cleanup levels.
Historic Data	A change in carbon ranges will make it difficult to compare previous GRO, ORO and RRO results. Comparability of results will become a major concern at any current cleanup that relies on trend analysis to demonstrate remediation. In order to make valid comparisons, studies could be used to determine how the

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	methods correlate, but this will vary with each petroleum source. This will add to the cost of monitoring and evaluating the cleanup process.
Historic Data	We suggest that DEC provide a written policy statement concurrent with any regulation changes on the use of old GRO, DRO, and RRO data if the AK Methods are revised as described.
Historic Data	6.1 – If you mean changing the carbon range from C6 to C5, and C25 to C21, then I think the changes to would be minimal and largely invisible (if they are needed at all). The old data is expected to be similar to the data collected using the revised ranges because the C5 to C6 fraction has a short overall half-life in the environment and fro arctic diesel and jet fuels, there is very little mass in the C21 to C25 range.
Hydrocarbon Risk Calculator	Consider that using the HRC increases reliance on ICs for long term site management, which may be at odds with the expectations of the public and landowners
Hydrocarbon Risk Calculator	Recognize that using the HRC may lead to potential disputes of fairness and appropriateness of petroleum cleanup levels due to substantial deviations from the method 1 and 2 tables
Implementation	Petroleum cleanup remedies are lengthy actions and consideration should be given to how new regulations will be implemented in order to minimize cost and schedule impacts. A phased transition to the new regulations should be implemented to allow ongoing remedial actions to continue uninterrupted. ADEC should consider the impacts and timing of regulatory changes to on-going investigations and field work especially during field season. Consideration should be given to how the regulations will affect approved Work Plans, Record of Decision and other decision documents. The revised regulations should not be enforced retroactively at sites where signed decision documents exist. Consideration should also be given to closure requirements (i.e., how to obtain site closure) in the regulations and not limited to guidance or method documents.
Implementation	Is it easy to implement? Judging by the answers above, "NO"! It is obviously more time consuming for the labs separating all the aromatics and aliphatic s and then adding them up. ADEC can do better than Washington states guidelines.
Interstate Technology and Regulatory Council	The Interstate Technology and Regulatory Council (ITRC) is currently developing a guidance document titled *TPH Risk Evaluation and Petroleum Contaminated Sites*. This document is expected to be published in 2018. The guidance will include discussions on both human health and ecological risk as well as provide information on approaches to address polar compounds (e.g., biodegradation metabolites) in the risk-based decision making process. We encourage the ADEC to incorporate recommendations from this new guidance into its regulation updates, even if this may result in a delay in your efforts to update the regulations.
Justification for regulation changes	~26,000 diesel spills reported to DEC in the past 30 years. Were any drinking water wells impacted? Since the 1980's, I've regularly asked SPAR managers if they knew of any active drinking water wells impacted by a diesel spill. PPRP had identified a couple wells with contamination below cleanup levels, but do not keep detailed records. CSP keeps site records, but no contaminated wells list. A Google search of alaska.gov for entries containing all the words drinking, water, wells, contaminated, and diesel had >2400 hits. Only two

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	drinking water wells (one was not in use) were found impacted above any groundwater cleanup levels (DRO, GRO, or BTEX) resulting from only a diesel spill.
Justification for regulation changes	The Clean as Dirt (CaD) analogy might be useful in evaluating and explaining bulk fuel cleanup levels for different soils. Since most of Alaska is covered in organics far exceeding current DRO and RRO cleanup levels, you'll have to show how fuels add to the actual bulk risk. Empirical methods, such as modified SPLP tests, will be more convincing.
Justification for regulation changes	New regulations should be founded on sound science and use accurate modeling and risk calculations which need to be consistently and uniformly applied at all sites in order to achieve cleanup goals.
Justification for regulation changes	I believe you met your mission statement that the new regulations allow the department to develop more scientifically defensible cleanup levels that are protective of human health and environment. Unfortunately the regulations were made to aid the government and not the people. Government has a habit of adding layer and layer of regulations on top of one another so that a common person has no idea what we are taking about. The KISS (Keep It Simple) method should be applied so the regulations can be easily followed. The more confusing you make it on the public, the less likely the state will receive a spill call from the RP.
Justification for regulation changes	Explaining how the proposed revisions will maintain or improve human health and environmental protection would be helpful for the public in understanding the implications of these changes.
Justification for regulation changes	Is the change of the regulations coming from EPA?
Maximum Allowable Concentrations	We support the concept of having maximum allowable concentrations based on considerations of preventing future pollution, aesthetics (soil staining, odors, phytotoxicity), and public acceptance of DEC's management of petroleum contaminated sites.
Maximum Allowable Concentrations	3.5.6 – The maximum allowable concentration criteria should be repealed or applied as written in the existing regulation. The current ADEC policy of requiring an IC for an exceedance of the maximum allowable concentration criteria is not consistent with the written regulations.
Method 1	Including all other compounds listed in Table B1 under Method Two in the Method One cleanup process makes the Method One process overly complicated and requires testing for a much larger list of constituents. A comparative approach, using updated petroleum ranges and limited number of additional constituents (if absolutely necessary), is preferred to ensure a simple and effective tool remains available for use.
Method 1	The equation provided indicates that the values for each fraction-specific carbon range would be weighted using the relative percentage of each fraction (expressed as a fraction). It seems that the percentage of each fraction-specific carbon range should be used for each corresponding value instead of using the overall fraction percentage (for example, based on the percentages provided in Table 1, 39% would be used for C5-C8 aromatics and 11% would be used for >C8-C10 aromatics, rather than using 50% for both). Please clarify the equation and provide an example of input parameters, with units. It's unclear if this approach derives higher or lower cleanup levels compared to current regulations.

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Method 1	We agree that the Method One cleanup levels for petroleum should be modified using the three listed options. This will make the Method One approach a bit more flexible for different land uses and site situations.
Method 1	We support removing the matrix table
Method 1	We support proposed modifications to the Method 1 Arctic zone to derive cleanup levels for Human Health as well as Gravel Pads and Tundra. In addition, we agree with proposed stipulations for sampling of nearby surface water to ensure that gravel pad cleanup levels are sufficiently protective.
Method 1	2. – I am not opposed to eliminating the existing Method 1 approach but the details of the replacement need to be worked out. I would like to see more information on examples where the existing Method 1 cleanup levels were not protective in the Arctic zone.
Method 1	I see no issues with the small changes for example 2.1.1, 2.1.2, etc. where footnote will be added or where you include cleanup levels to gravel pads and tundra in Arctic Zone.
Method 1	We agree a more streamlined, combined table (proposed by ADEC) may have merit. We support ADEC's proposal to revise the definitions for Diesel Range Organics (DRO) and Residual Range Organics (RRO) to limit Diesel Range Organics to petroleum hydrocarbon compounds corresponding to an alkane range from the beginning of C10 to the beginning of C21, and expanding the definition for Residual Range Organics to include petroleum hydrocarbon compounds corresponding to an alkane range from the beginning of C25 to the beginning of C36. We support ADEC's proposal to update Method One to require complete sampling and meeting cleanup levels for petroleum-related compounds in Table B1.
Method 1	Can we get EPH/VPH data and establish a ratio for the entire site, then apply that ratio to Method 1 numbers?
Method 1	Why not have commercial/industrial levels for method one?
Method 1	Would method 1 still require BTEX along with the fractions
Method 2	The Washington State EPH and VPH methods are well established for the determination of aliphatic and aromatic fractions. The effort for most commercial labs that are already certified for the Alaska methods will be minimal. Selecting fewer fractions will simplify the process and help offset the analytical costs.
Method 2	We think the use of multiple standards (i.e., EPH/VPH and GRO/DRO/RRO) is not workable and the state should focus on developing the EPH/VPH approach and eliminating the current GRO/DRO/RRO standards. This reflects best science and reduces the uncertainty to the regulated community relative to the potential need to address dueling standards.
Method 2	The fractionation approach should be transparently presented; the number of fractions and surrogates for each fraction should be based on adequate toxicological information. Given this assumption, we think that DEC may be suggesting to use more fractions than may be warranted.
Method 2	Massachusetts Department of Environmental Protection (MADEP) does not include BTEX in their fractions because these compounds are evaluated individually. Including them in the total TPH analysis essentially double-

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	counts these compounds. Consistent with MADEP, we suggest excluding aromatic chemicals with fewer than 9 carbon atoms from evaluation as a group. Alternatively, the concentrations of surrogate chemicals could be subtracted from the corresponding EPH/VPH carbon range concentrations to avoid double-counting, consistent with current Washington State methods.
Method 2	Overall, DEC appears to be attempting to use more fractions than may be warranted based on existing toxicity information. Using inappropriate surrogates for small subdivisions of carbon ranges may not provide a usable basis to regulate TPH. Instead, we suggest lumping some of the fractions together. This lowers the uncertainty of using questionable surrogates across small ranges, and simplifies the evaluation. Using 6 rather than 13 fractions (3 aliphatic, 3 aromatic) seems to be working for MADEP, and we recommend something more aligned with their approach
Method 2	There is no clear rationale to support the proposed 13 individual aliphatic and aromatic fractions. The resultant data and effort required does not increase health protection. Cleanup levels should not be established by fraction. TPH analysis is non-specific and the exact composition and nature of each fraction is not completely known As such, the analysis of aliphatic and aromatic petroleum fractions and assignment of toxicity surrogates to these fractions are approximations at best as is the summation of the risks for gasoline range and diesel range TPH fractions. To regulate by each aliphatic and aromatic fraction appears to suggest an exactness, precision, and specificity in the analysis that does not exist. Application of the Northwest Methods provides a good representation of the composition and risk of the TPH and are comparable to other State methods that are based on a surrogate toxicity approach such as that developed by the TPH Criteria Working Group.
Method 2	I don't think that separate cleanup levels for 13 aromatic and aliphatic fractions is reasonable or functional especially when the cleanup calculations are based on fresh fuels and use 3-phase partitioning. The resulting cleanup levels would be relatively meaningless.
Method 2	What is the usefulness of including the C5 to C8 aromatic fraction in the calculation when the fraction is also fully represented by the BTEX compounds?
Method 2	Requiring VPH and EPH testing for comparison to lookup tables is not justified given that the lookup table values are based on three phase calculations and fresh fuel assumptions (which we know are not representative).
Method 2	The non-cancer toxicity values listed in the proposed ADEC table for BTEX C5-C8 do not appear to be calculated from the ADEC-proposed surrogate toxicity values. These should be corrected. The weighted fraction of BTEX proposed by ADEC using Alaska-specific fuel ratios is a reasonable approach; a corrected calculation using the ADEC-recommended weighted RfCs and RfDs from IRIS are shown in the table below. The ADEC-proposed values are shown in the subsequent chart (orange font).
Method 2	ADEC also proposes to eliminate the Arctic Zone from Method Two because it finds human health cleanup levels in Method Two "are not protective enough for the receiving environment and human health receptors are typically not present" in the Arctic. We support ADEC's proposal to move all Arctic Cleanup Threshold analysis

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	to Method One, if ADEC determines this is a more protective approach when it finalizes its proposed cleanup thresholds.
Method 3	4.1 -- Yes, of course the Method One cleanup levels should be modified by or over ridden by Method 3 calculated values. Cleanup levels should not be based on the soil saturation limit.
Method 3	4.2 – The ADEC 4-phase model and alternative models such as the HRC need to be allowed to change the human health levels for the hydrocarbon fractions and the individual compounds because the human health levels are based in part on three phase calculations, Csat and solubility limits.
Method 3	6.2 – The VPH and EPH methods should only be needed to characterize the NAPL source area and the dissolved phase concentrations for Method Three (not for every sample).
Method 3	Consider using a 4-phase partitioning model for the migration to groundwater and inhalation exposure routes instead of the 3-phase partitioning model. The 3-phase model overestimates chemical concentrations present in each media when NAPL is present, even if NAPL is at residual levels. This recommendation also applies to Method One.
Method 3	More information is needed on how Method One will be modified before we can make a recommendation on Method Three revision. However, in general, Method Three has historically been used by responsible parties to propose cleanup thresholds that are less stringent than Method Two would require. In general, we do not support using Method Three to circumvent more stringent cleanup standards that would otherwise be required by Methods One or Two. We recommend that ADEC provide specific justification for retaining Method Three at all.
MTGW	Inclusion of the migration to groundwater pathway in setting cleanup levels is unnecessary as it does not provide additional health protection, its use and application is questionable. Site data can demonstrate exceedance of soil cleanup levels with no associated impact to groundwater. If migration to groundwater is retained, the analysis must include a 4-phase model.
MTGW	3.5.4 – I think that considering the migration to groundwater pathway is a valuable part of the CSM and important for understanding of site conditions, fate & transport process and remedial process. The challenge is to understand and use representative calculations for the pathway.
MTGW	Would there be a modeling option for the migration to groundwater pathway? This proposal is pretty much what the HRC does
MTGW – SPLP	Requiring SPLP analyses as a justification for excluding a leaching to groundwater pathway is a costly approach because it assumes by default that migration to groundwater is a complete pathway at every site. At some sites, the nature of the matrix and depth to water should preclude the need to quantitatively evaluate the potential for the pathway to be complete and significant. Further, in areas where there is no groundwater (e.g., Arctic), this approach is not reasonable.
MTGW – SPLP	It would be preferable to at least have the option of using the Synthetic Precipitation Leaching Procedure (SPLP) if it could be demonstrated that the migration to groundwater risk is less than assumed from a contaminated soil

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	mass. We urge ADEC to consider an analytical method for the fractions where extracts from samples may be analyzed directly without having to be further fractionated; such as GC or GC/MS.
MTGW – SPLP	We recommend that ADEC allow screening values to be superseded by SPLP data, and allow actual groundwater data to supersede the SPLP results. This approach could be similar to that used by the Florida Department of Environmental Protection (FDEP). The ability to use screening values minimizes the number of analyses required for sites where concentrations are low. It would be helpful for ADEC to describe how they will view the situation where SPLP leachate concentrations are greater than groundwater screening values but actual groundwater data show concentrations to be less than risk-based values. Because of the potential for petroleum hydrocarbons to attenuate naturally in the soil column but not during the SPLP extraction process, ADEC should allow actual groundwater data to supersede the SPLP results.
MTGW – SPLP	I would not replace the migration to groundwater pathway evaluation with an SPLP approach because the SPLP becomes a black box which does increase understanding.
MTGW – SPLP	If ADEC adopts the more site-specific synthetic precipitation leaching procedure (SPLP) evaluation for migration to groundwater, we recommend providing screening criteria for each petroleum fraction so that, when met, groundwater samples would not be required. It appears that the referenced Texas method for SPLP requires soil concentrations exceed criteria and groundwater concentrations not exceed criteria before the SPLP approach can be used. Given the cost of mobilization and logistical considerations for many sites in Alaska, it would be unnecessarily prohibitive to require collection of groundwater samples in addition to analyzing soil by SPLP.
Other issues	DEC SPAR's main deficiency is health risk quantification and communication
Other Issues	Statewide average arsenic levels of 17.3 mg/kg are 87 times DEC's 0.2 kg/kg cleanup level. Instead of EPA's "what can practically be done" risk management, DEC now simply excludes natural arsenic and chromium (forgot thallium?). This Clean as Dirt (CaD) practical excuse for risk management reveals the conservativeness of DEC's new cleanup levels. Since all the cleanup levels were developed using similar data, shouldn't this CaD factor of 87 apply to all chemicals?
PAHs	We disagree with the Department that all petroleum samples should be analyzed for PAHs. Very little middle end distillate is present in GRO and consequently PAHs are not generally present. This type of analysis (i.e. PAHs) should only be required if DRO or RRO total concentrations exceed Method one values.
PAHs	Including all other compounds listed in Table B1 under Method Two in the Method One cleanup process makes the Method One process overly complicated and requires testing for a much larger list of constituents. A comparative approach using updated petroleum ranges and limited number of additional constituents (if absolutely necessary) is preferred to ensure a simple and cost effective tool remains available for use.
PAHs	What if you are working on a diesel spill, will you analyze for all petroleum ranges or will it just be just for diesel fractions? What about PAHs, etc.?
Polar fraction	Studies would be needed to evaluate the magnitude of the polar fraction at each site. This will require analysis of total GRO, DRO and RRO, the proposed 13 fractions, as well as possibly the individual BTEX and PAHs. This

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	will greatly impact the cost of the cleanup process. We think a hydrocarbon risk calculator should be available for use at sites, and that the polar fraction should be excluded from the risk evaluation.
Polar fraction	If the polar fraction is toxic, then it should not be stripped out of the analysis. Perhaps modifying the extraction method to retain the polar fraction would be beneficial. Further toxicity data may need to be collected to understand the toxicity of the polar fraction enough to begin quantifying exposure to this fraction. Until then, we suggest retaining the current EPH/VPH methods and excluding the polar fraction. The small potential impact this could have on underestimating overall toxicity should be overwhelmed by the conservative nature of the toxicity values selected to represent the rest of the mixtures.
Polar fraction	We do not anticipate that the polar fraction will be persistent in the environment, and hence it is unlikely to pose a potential risk to ecological populations or communities.
Polar fraction	We recommend that DEC update and make public its written evaluation of the literature on the toxicity of the polar fraction. The current evaluation paper was published in 2001. Given that this is a longstanding issue, we recommend that DEC determine whether the polar fraction is of sufficient concern to require evaluation at all sites. If so, we recommend that, if practicable, an indicator or surrogate approach could be specifically designed for the polar fraction. If the polar fraction is not found to be of sufficient concern, then we recommend that AK 101/102/103 be excluded from consideration in the proposed Method 2 changes.
Polar fraction	The Northwest Method is recommended to address polar fractions and when cleanup using silica gel is appropriate, and to address usage related to biogenic interference. Polar organics, since they are not specifically targeted for analysis, should be considered as part of the petroleum mixture. The Northwest Method does allow for silica gel cleanup for soil extracts being analyzed using NWTPH. This approach is recommended since the true composition of polar organics will likely never be known (and changes over time). Further, the lack of data, or limited data available on the toxicity of polar specific polar compounds prevents any other approach.
Polar fraction	The use of the VPH and EPH methods (which include silica gel cleanup) and the GRO, DRO and RRO methods (which do not require silica gel cleanup) for soils is not needed to address the polar fraction because the polar fraction tends to partition into the water phase.
Polar fraction	3.5.3 -- The ADEC needs to provide more and specific information on the ecological risk associated with polar compounds.
Polar fraction	3.5.7 – The presence of the polar fraction should be acknowledged and may be quantified by running water samples for both the VPH and EPH methods (with silica gel cleanup) and the GRO, DRO and RRO methods (without silica gel cleanup). The polar fraction should not be considered to have the same toxicity or risk as the aromatic fraction because we don't adequate toxicity data to document this.
Polar fraction	There doesn't seem to be much research on polar fractions, is that a problem?
Polar fraction	There is going to be a lot of variability between DEC PMs with respect to the polar compounds. There is going to need to be a standard.
Reopening sites	When cleanup levels are adjusted or changed the outcome seems to re-open a number of closed sites to become active sites. Please consider this effect if cleanup levels get changed as Departments will have little or no budget.

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Request for supporting information	The introductory comments for the Notice of Public Scoping document indicate that the ADEC is considering changes to the regulations in part because the ADEC has received comments regarding better ways to address petroleum. I think that a similar comment was made for the changes to the individual compound cleanup levels. Can I get a copy of the most pertinent letters or emails that prompted ADEC to undertake changes to the petroleum cleanup levels and individual compound cleanup levels?
Request for supporting information	The Possible Updates and Revisions to ADEC Regulations for Petroleum Cleanup Levels document included a couple of references to the risk posed by the polar fraction – can I get pdf copies of the documents or references for the documents that ADEC is referring to?
Rulemaking Process	The ADEC should work with environmental professionals in a working group format, so that issues (e.g. objectives, calculation approaches and intended and un-intended consequences) are openly discussed and understood by all.
Sample Analysis	Does the State of Alaska have a laboratory that can do sample analysis to meet our regulatory changes? If SGS does not have the capability then the changes should not be implemented. Forcing spillers to send samples out of state is not cost effective and very problematic (especially when weather and location keeps samples from reaching a destination in a timely matter.
Sample Analysis	So the lab needs to run three samples per sample location? And the AK series?
Sample Analysis	Is there a difference in turnaround times for AK series versus EPH/VPH?
Saturation/Solubility	We find the saturation limits useful since volatilization and cleanup levels in soil are both affected by Csat. However, it may be helpful to provide the Csat values separately from cleanup levels, with an indication where the cleanup level exceeds the saturation limit and free-phase product may be present. This approach is used by the USEPA in their Regional Screening Levels; see the RSL User Guide for more information.
Saturation/Solubility	Solubility limits should be retained because free-product should be avoided in the environment.
Saturation/Solubility	5. – The groundwater cleanup levels have to be based on representative risk based calculations. They should not be constrained by solubility limits.
Saturation/Solubility	Recommend removing the caps (upper limits) on human health risk-based cleanup levels at solubility limits. It appears that the reasons for capping the cleanup levels at the solubility limit are to address concerns with LNAPL, taste, odor, or ecological risks. These reasons are not directly related to human health risk so the use of a human health risk-based cleanup number to evaluate these issues is inappropriate. Consider addressing these non-human health risk issues separately on a site-specific basis, perhaps as secondary criteria, where LNAPL, taste issues, odor, sheen, or ecological receptors are identified.
Saturation/Solubility	Existing regulation may force responsible parties to remove all LNAPL whether or not it creates a health risk. Specific to item 5.3 below we suggest that the department repeal cleanup levels "capped at solubility". In general, we believe actual site concentrations in groundwater and soil should be compared to the proposed health-based standards. In addition, where LNAPL is present we advocate that site-specific concentrations of CoC be determined by sampling soil and groundwater. Sampling groundwater and soil in an LNAPL source area should be considered after site-specific and technology considerations are understood.

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Saturation/Solubility	We do not have sufficient information in ADEC's proposed draft to fully comment on whether ADEC should retain, modify, or repeal the petroleum cleanup levels that are capped at solubility.
Screening	Development and descriptions of rapid screening methods to help streamline site investigation is recommended. Use of preliminary, screening level analyses to clear sites with low concentrations prior to the proposed more extensive multi-fraction analyses would improve efficiency. Rapid screening could be performed with GRO/DRO/RRO confirmatory samples. Initial screening levels and 'no action' points should be easy to identify.
Site characterization	Montana DEQ has done previously and similarly as to what Alaska DEC is proposing by going from DRO and GRO/BTEX procedures to modified Massachusetts EPH and VPH procedures for UST monitoring and for petroleum releases. Our laboratory was involved in the implementation of the EPH and VPH procedures in Montana regulations, and in particular we helped them to include adoption of an EPH Screen procedure (Essentially a DRO procedure only) to identify those samples needing full EPH method characterization. Utilizing an EPH screen procedure has substantially reduced analysis costs for contaminated sites by not requiring a full EPH method on samples considered clean relative to site specific criteria, allows better hydrocarbon type identification, generates better full EPH data (prevents separation column over-loading), and generates data comparable to previous DRO and GRO/BTEX data.
Site characterization	Given the substantial cost difference between analytical methods for bulk hydrocarbons and fractionated hydrocarbons, it may be useful to allow both bulk and fractionated cleanup criteria to be used at the same site. We recommend some site-specific flexibility to allow both proposed Method One and Method Two cleanup levels at a contaminated site.
Site characterization	Consider allowing the use of site-specific aliphatic and aromatic percentages to calculate the bulk GRO, DRO, and RRO cleanup levels. This would add flexibility and cost savings on a site-specific basis for using the bulk hydrocarbon analytical methods.
Site characterization	We are concerned about unchanged requirements for site characterization despite the evolving understanding of contaminant behavior, site characterization tools and methods, and historical patterns of iterative and insufficient site characterization efforts
Site closure	Are people going to be able to close more sites to save on the increase in the analytical cost with changes to method two?
Site closure	Will this provide more opportunity for site closures without ICs?
Site closure	We are concerned about the complications and limitations of the reliance on institutional controls for long-term site management
Spills	New cleanup level and tables established will work on regulated vessel and facilities that deal with the issues every day, but not on every day spills from the public like home heating oil spill and rural communities where majority of our spill reports come from.
Spills	We urges the Department to physically attend every spill incident that can be accessed through conventional means, and to take advantage of every opportunity for on-the-job training opportunities for Prevention and

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	Response personnel by allowing them the opportunity to actively investigate incidents. We further urge the department to look for areas within regulation that changes can be made to charge investigators with the responsibility to provide an on-scene presence to verify, observe, and interview.
Table C	We support updates to groundwater cleanup levels to incorporate the most current analytical methods for petroleum analysis, and to align with the proposed revision in carbon ranges described in Methods One and Two above.
Table C – Fractions	The suggested approach for multiple groundwater cleanup levels for both fractions and carbon ranges is overly complex. It is not clear why the approach to develop cleanup levels for groundwater is not consistent with that for soil.
Table C – Fractions	This section states that groundwater must meet Table C GRO, DRO, and RRO values. How will this be reconciled with the EPH/VPH method and cleanup levels that are proposed to be included in future regulations?
Table C – Fractions	5.1 – As described above for soil, having 16 separate cleanup levels for hydrocarbons (13 A&A EC fractions plus GRO, DRO and RRO) does not seem reasonable.
Table C – Fractions	Recommend removing carbon ranges >C16 from the groundwater cleanup levels because the effective solubility of that range dictates hydrocarbons will not dissolve in water.
Taste and odor	Taste and odor should not be used as a primary basis for petroleum cleanup. We agree that repealing the current language is appropriate and instead defer to the existing language regarding secondary MCLs.
Taste and odor	Taste and odor thresholds should no longer be included in petroleum cleanup regulations. Remedial action based on the Washington State site investigation criteria (when indicated) will adequately address taste and odor. Taste and odor thresholds are not risk based and are more appropriate for evaluating the quality of finished drinking water. There are standard laboratory methods for odor and taste. If ADEC does not want to eliminate the subjective thresholds, then a standard method for evaluating odor and taste should be approved.
Taste and odor	We support site-specific considerations for taste and odor and believe the department should repeal the "taste and odor" language and regulate it as a secondary MCL on a site-specific basis.
Taste and odor	ADEC explains that odor and taste thresholds may be exceeded for petroleum fractions even though contaminant concentrations are below the groundwater cleanup levels listed in Table C of 18 AAC 75.345. We support ADEC's consideration of new regulatory language to address taste, odor, and aesthetics for groundwater that may require additional cleanup beyond existing petroleum cleanup levels listed in Table C of 18 AAC 75.345.
Taste and odor	Someone suggested it might be useful to keep the groundwater odor and taste thresholds for sites where maximum allowable is not exceeded.